

## Remarks

In the present response, claims 11-12, 15-23, and 26-29 are presented for examination.

### Claim Rejections: 35 USC § 112

Claim 21 is rejected under 35 USC § 112, second paragraph, as failing to particularly point out and distinctly claim the invention. This rejection is cured since the word “online” is removed from claim 21.

### Claim Rejections: 35 USC § 101

Claims 21 – 29 are rejected under 35 USC § 101 as being directed to non-statutory subject matter. This rejection is cured since claims 21-29 are amended to recite a “hardware” system.

### Claim Rejections: 35 USC § 101

Claims 11-15 and 20-26 are rejected under 35 USC § 101 as being directed to non-statutory subject matter. Specifically, the Office Action states that these claims do not provide a physical transformation or provide a useful, concrete, and tangible result. These rejections are cured since independent claims 11 and 21 are amended to recite that the Bayesian network is used to model the environment and diagnose problems or predict events in the environment. Support for the amendments appears at least at page 1, lines 12-23; p. 1, line 30 to p. 2, line 2; p. 3, lines 4-8; and p. 14, lines 1-21.

### Claim Rejections: 35 USC § 102(b)

Claims 11-16 and 20-26 are rejected under 35 USC § 102(b) as being anticipated by “Update rules for parameter estimation in Bayesian networks” by Eric Bauer, et al. (Bauer). These rejections are traversed.

Each of the claims recites one or more elements not taught or even suggested in Bauer. By way of example, independent claim 11 recites determining an estimate of the parameters in response to the present observation data. The claim then recites adapting the learning rate by increasing the learning rate when an error between the estimate and a

mean value of the parameters is relatively large and decreasing the learning rate when convergences is reached between the estimate and the mean value of the parameters. Bauer does not teach or suggest this method for adapting the learning rate.

One difference between the pending claims and Bauer is how the learning rate is adapted. In Bauer, the learning rate is not increased or decreased as recited in claim 11 but set to a value:

While the value of  $n^*$  cannot be computed, evidence acquired when applying EM( $n$ ) algorithms to other learning tasks shows that certain values of  $n$  seem to work well for most problems.... These experiments indicate that a value of  $n = 1.8$  appears to work well, and certainly much better than  $n = 1$ . (See Bauer at p. 2, column 1, fourth full paragraph).

Bauer does acknowledge that the learning rate can change. Bauer, however, never teaches or suggests that the learning rate increases when an error between an estimate of parameters of observation data ( $D$  in Bauer) and a mean value of the parameters is relatively large and that the learning rate decreases when convergences is reached between the estimate and the mean value of the parameters. In other words, the independent claims recite specific instances for increasing and decreasing the learning rate. Bauer does not teach implementing these instances in the model of the Bayesian network.

Anticipation under section 102 can be found only if a single reference shows exactly what is claimed (see *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985)). For at least these reasons, the claims are allowable over Bauer.

#### **Claim Rejections: 35 USC § 103(a)**

Claims 17-19 and 27-29 are rejected under 35 USC § 103(a) as being unpatentable over Bauer in view of US publication number 2003/0018494 (Bronstein). These rejections are traversed.

As explained above, independent claims 11 and 21 recite elements relating to increasing and decreasing the learning rate. These elements are not taught or suggested in Bauer. Bronstein fails to cure the deficiencies of Bauer. Thus for at least the reasons given in connection with independent claims 11 and 21, dependent claims 17-19 and 27-29 are allowable over Bauer in view of Bronstein.

**Claim Rejections: 35 USC § 103(a)**

Claims 11-16, 18-26, and 28-29 are rejected under 35 USC § 103(a) as being unpatentable over USPN 6,807,537 (Thiesson) in view of USPN 6,269,351 (Black). These rejections are traversed.

Each of the independent claims 11 and 21 recites one or more elements that are not taught or suggested in Thiesson in view of Black. These missing elements show that the differences between the combined teachings in the art and the recitations in the claims are great. As such, the pending claims are not a predictable variation of the art to one of ordinary skill in the art.

By way of example, claim 11 recites determining an estimate of the parameters in response to the present observation data. The claim then recites adapting the learning rate by increasing the learning rate when an error between the estimate and a mean value of the parameters is relatively large and decreasing the learning rate when convergences is reached between the estimate and the mean value of the parameters. Thiesson in view of Black do not teach or suggest these elements.

The Examiner admits that Thiesson “does not explicitly show adapting a learning rate for the parameter such that the learning rate responds to changes in the environment indicated by present observation data” (see OA at p. 11). Applicants agree with this admission. The Examiner, however, attempts to cure this deficiency with Black. Applicants respectfully traverse.

Black teaches a neural network that changes the learning rate in response to training performance. One difference between the pending claims and Black is how the learning rate is adapted. In Black, the learning rate is not increased or decreased as recited in claim 11. In other words, Black never teaches or even suggests that the learning rate increases when an error between an estimate of parameters of observation data and a

mean value of the parameters is relatively large and that the learning rate decreases when convergences is reached between the estimate and the mean value of the parameters. In other words, the independent claims recite specific instances for increasing and decreasing the learning rate. Black does not teach implementing these instances in a model of a Bayesian network.

As such, the differences between the claims and the teachings in Thiesson in view of Black are great since these references fail to teach or suggest all of the claim elements. As such, the pending claims are not a predictable variation of the art to one of ordinary skill in the art.

For at least these reasons, the claims are allowable over Thiesson in view of Black.

**Claim Rejections: 35 USC § 103(a)**

Claims 17 and 27 are rejected under 35 USC § 103(a) as being unpatentable over Thiesson in view of Baker and Bronstein. These rejections are traversed.

As explained above, independent claims 11 and 21 recite elements relating to increasing and decreasing the learning rate. These elements are not taught or suggested in Thiesson in view of Baker and Bronstein. Thus for at least the reasons given in connection with independent claims 11 and 21, dependent claims 17 and 27 are allowable over Thiesson in view of Baker and Bronstein.

## **CONCLUSION**

In view of the above, Applicants believe that all pending claims are in condition for allowance. Allowance of these claims is respectfully requested.

Any inquiry regarding this Amendment and Response should be directed to Philip S. Lyren at Telephone No. 832-236-5529. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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